

CLAIMS

1. A syringe having a distal end portion to which a first female connector and a second female connector provided on an outer peripheral surface thereof with a female-side screw engagement portion can be alternatively connected, said syringe comprising:

a mouth portion which is provided at a distal end portion thereof with a male taper portion to be fitted in a bore portion of said first female connector and a bore portion of said second female connector and which is provided therein with a passage for permitting a liquid to pass therethrough; and

a lock adapter provided at an outer peripheral portion of said mouth portion, said lock adapter being relatively movable in the axial direction of said mouth portion and being provided on an inner peripheral surface thereof with a male-side screw engagement portion for making screw engagement with said female-side screw engagement portion; wherein

said lock adapter can be retracted to a retraction position on the proximal end side at the time of an operation of fitting said male taper portion into said bore portion of said first female connector.

2. A syringe having a distal end portion to which a

first female connector and a second female connector provided on an outer peripheral surface thereof with a female-side screw engagement portion can be alternatively connected, said syringe comprising:

a mouth portion which is provided at a distal end portion thereof with a male taper portion to be fitted in a bore portion of said first female connector and a bore portion of said second female connector and which is provided therein with a passage for permitting a liquid to pass therethrough; and

a lock adapter provided at an outer peripheral portion of said mouth portion, said lock adapter being relatively rotatable about said mouth portion, being relatively movable along the axial direction of said mouth portion, and being provided on an inner peripheral surface thereof with a male-side screw engagement portion for making screw engagement with said female-side screw engagement portion; wherein

said lock adapter can be retracted to a retraction position on the proximal end side at the time of an operation of fitting said male taper portion into said bore portion of said first female connector.

3. The syringe as set forth in claim 1 or 2, wherein said male taper portion protrudes beyond the distal

end of said lock adapter by not less than 7.5 mm when said lock adapter is located in said retraction position.

4. The syringe as set forth in any of claims 1 to 3, having a distal end side fixation position where said lock adapter is fixed to said mouth portion when said lock adapter is located on the distal end side of said mouth portion.

5. The syringe as set forth in claim 4, having a rotation permitting position where said lock adapter is relatively rotatable about said mouth portion, on the distal end side relative to said retraction position, wherein

said distal end side fixation position is located on the mouth portion distal end side relative to said rotation permitting position.

6. The syringe as set forth in claim 4 or 5, wherein said male taper portion protrudes beyond the distal end of said lock adapter by not less than 2.1 mm when said lock adapter is located in said distal end side fixation position.

7. The syringe as set forth in any of claims 1 to 6, wherein said lock adapter is relatively movable by not less than 5.4 mm along the axial direction of said mouth portion.

8. The syringe as set forth in any of claims 1 to 7,

wherein the inside diameter (on average) of said mouth portion is not less than 1.2 mm.

9. The syringe as set forth in any of claims 1 to 8, wherein the length of said mouth portion is in the range of 16 to 20 mm.

10. The syringe as set forth in any of claims 1 to 9, comprising an outer hollow cylinder provided at a distal end portion thereof with said mouth portion and said lock adapter, and a gasket slidable in said outer hollow cylinder, wherein

the volume of a space defined by said outer hollow cylinder and said gasket when said gasket is located at the distal end of the inside of said outer hollow cylinder is not more than 0.1 mL.

11. A cap to be mounted to a mouth portion of a syringe outer hollow cylinder, said syringe outer hollow cylinder comprising said mouth portion projectingly formed at the distal end of said syringe outer hollow cylinder and provided at a distal end portion thereof with a male taper portion, and a lock adapter provided at an outer peripheral portion of said mouth portion, said lock adapter being relatively movable along the axial direction of said mouth portion and being provided on an inner peripheral surface thereof with a male-side screw engagement portion, said cap

comprising:

a bottomed hollow-cylindrical cap main body comprising a bore portion, and a female-side screw engagement portion formed on an outer peripheral portion of said cap main body for screw engagement with said male-side screw engagement portion; and

a packing formed of an elastic material and provided in said bore portion of said cap main body; wherein

at least a part of the inner peripheral surface of said bore portion makes close contact with said male taper portion over the entire circumference when said cap main body is mounted to said mouth portion.

12. The cap as set forth in claim 11, wherein when the inner peripheral surface of said bore portion makes close contact with said male taper portion, said packing is clamped between an end face of said bore portion and the distal end of said mouth portion to seal said mouth portion in a liquid-tight manner.

13. A method of producing a prefilled syringe comprising: a syringe outer hollow cylinder having a mouth portion projectingly formed at the distal end of said syringe outer hollow cylinder and provided at a distal end portion thereof with a male taper portion, and a lock adapter provided at an outer peripheral portion of said

mouth portion, said lock adapter being relatively movable along the axial direction of said mouth portion and being provided on an inner peripheral surface thereof with a male-side screw engagement portion; a cap as set forth in claim 11 or 12 which is mounted to said mouth portion; and a liquid preparation filling said syringe outer hollow cylinder; said method comprising the steps of:

sterilizing said syringe outer hollow cylinder and said cap;

then mounting said cap to said mouth portion in a sterile environment; and

thereafter feeding said liquid preparation into said syringe outer hollow cylinder in a sterile environment.

14. A method of producing a prefilled syringe comprising: a syringe outer hollow cylinder having a mouth portion projectingly formed at the distal end of said syringe outer hollow cylinder and provided at a distal end portion thereof with a male taper portion, and a lock adapter provided at an outer peripheral portion of said mouth portion, said lock adapter being relatively movable along the axial direction of said mouth portion and being provided on an inner peripheral surface thereof with a male-side screw engagement portion; a cap as set forth in claim 11 or 12 which is mounted to said mouth portion; and

a liquid preparation filling said syringe outer hollow cylinder; said method comprising the steps of:

mounting said cap to said mouth portion and performing sterilization under this condition; and

thereafter feeding said liquid preparation into said syringe outer hollow cylinder in a sterile environment.